25 November 2008

This supplement has been prepared to present scientific and technical news items that may be of more interest to technical personnel at RDT&E activities and the labs, or the medics rather than the broader readership of the basic CB Daily. Due to the nature of the material, the articles, if available online, are usually only available through subscription services thus making specific links generally unavailable. Thus, usually only the bibliographic citation is available for use by an activity's technical library.

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Chem-Bio News– Pandemic Influenza Edition # 37

1. BOSTON LAUNCHES FLU SHOT TRACKING: *"Using technology originally developed for mass disasters, Boston disease trackers are embarking on a novel experiment - one of the first in the country - aimed at eventually creating a citywide registry of everyone who has had a flu vaccination."*

2. MINISTRY, AIRLINE OFFICIALS EYE STOPPING NEW FLU TYPES AT AIRPORTS: *"Nineteen officials in total, including from the health ministry, police, immigration authority and local hospitals, reaffirmed they will cooperate to stop a possible pandemic by sharing information and conducting drills on a regular basis."*

3. TULANE UNIVERSITY TO DEDICATE $27.5 MILLION BIOSAFETY LAB AT 2008 PRESIDENTIAL SYMPOSIUM: *"The symposium coincides with the Dec. 5 dedication of Tulane's newly built Regional Biosafety Laboratory, a $27.5 million state-of-the-art research lab within the Tulane National Primate Research Center that is dedicated to developing treatments, vaccines and diagnostics for emerging infectious diseases that occur naturally and against agents that people may misuse for terror."*

4. PROTEIN 'TUBULES' FREE AVIAN FLU VIRUS FROM IMMUNE RECOGNITION: *"A protein found in the virulent avian influenza virus strain called H5N1 forms tiny tubules in which it "hides" the pieces of double-stranded RNA formed during viral infection, which otherwise would prompt an antiviral immune response from infected cells, said Baylor College of Medicine in an online report in the journal Nature."*

5. REAL-TIME PCR COMPARED TO BINAX NOW AND CYTOSPIN-IMMUNOFLUORESCENCE FOR DETECTION OF INFLUENZA IN HOSPITALIZED PATIENTS: *"Further studies are needed to determine the effect of influenza RT-PCR on patient management and costs in hospitalized patients."*

6. A COMMERCIAL ELISA DETECTS HIGH LEVELS OF HUMAN H5 ANTIBODY BUT CROSS-REACTS WITH INFLUENZA A ANTIBODIES: *"Absorption studies suggested that antibodies towards seasonal H3N2 and H1N1 influenza may cross-react with H5 antigen, giving false positive results with the ELISA."*

7. A CONSENSUS-HEMAGGLUTININ-BASED DNA VACCINE THAT PROTECTS MICE AGAINST DIVERGENT H5N1 INFLUENZA VIRUSES: *"We conclude that this vaccine, based on a consensus HA, could induce broad protection against divergent H5N1 influenza viruses and thus warrants further study."*

8. A NOVEL ROLE FOR NON-NEUTRALIZING ANTIBODIES AGAINST NUCLEOPROTEIN IN FACILITATING RESISTANCE TO INFLUENZA VIRUS: *"These results suggest that vaccines designed to elicit optimal heterosubtypic immunity to influenza should promote both Ab and T cell responses to conserved internal proteins."*

CB Daily Report

Chem-Bio News

BOSTON LAUNCHES FLU SHOT TRACKING
By Stephen Smith
The Boston Globe
November 21, 2008

"Using technology originally developed for mass disasters, Boston disease trackers are embarking on a novel experiment - one of the first in the country - aimed at eventually creating a citywide registry of everyone who has had a flu vaccination.

The resulting vaccination map would allow swift intervention in neighborhoods left vulnerable to the fast-moving respiratory illness.

The trial starts this afternoon, when several hundred people are expected to queue up for immunizations at the headquarters of the Boston Public Health Commission. Each of them will get a bracelet printed with a unique identifier code. Information about the vaccine's recipients, and the shot, will be entered into handheld devices similar to those used by delivery truck drivers."

The full article can be found at: http://www.boston.com/news/local/massachusetts/articles/2008/11/21/boston_launches_flu_shot_tracking/

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MINISTRY, AIRLINE OFFICIALS EYE STOPPING NEW FLU TYPES AT AIRPORTS
Associated Press on Breitbart.com
November 19, 2008

"Nineteen officials in total, including from the health ministry, police, immigration authority and local hospitals, reaffirmed they will cooperate to stop a possible pandemic by sharing information and conducting drills on a regular basis."

“While a similar council on risk management over public health has already been set up at Kansai International Airport, it will eventually be formed at Central Japan International Airport in Aichi Prefecture and Fukuoka Airport, according to the health ministry.”

The full article can be found at: http://www.breitbart.com/print.php?id=D94HTK5G0&show_article=1

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TULANE UNIVERSITY TO DEDICATE $27.5 MILLION BIOSAFETY LAB AT 2008 PRESIDENTIAL SYMPOSIUM
Tulane University News Release
November 20, 2008

“The symposium coincides with the Dec. 5 dedication of Tulane’s newly built Regional Biosafety Laboratory, a $27.5 million state-of-the-art research lab within the Tulane National Primate Research Center that is dedicated to developing treatments, vaccines and diagnostics for emerging infectious diseases that occur naturally and against agents that people may misuse for terror.

The facility is one of only 13 National Institutes of Health (NIH) supported Biosafety Level 3 laboratories in the country, and the only one affiliated with a primate research center, medical school and school of public health and tropical medicine. Biosafety Level 3 is a national designation for labs built with strict safety standards to study airborne contaminants and infectious diseases.”

The full article can be found at: http://tulane.edu/news/releases/pr_11202008.cfm?RenderForPrint=1

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PROTEIN 'TUBULES' FREE AVIAN FLU VIRUS FROM IMMUNE RECOGNITION
Baylor College of Medicine News Release
November 6, 2008

“A protein found in the virulent avian influenza virus strain called H5N1 forms tiny tubules in which it "hides" the pieces of double-stranded RNA formed during viral infection, which otherwise would prompt an antiviral immune response from infected cells, said Baylor College of Medicine in an online report in the journal Nature.

Two domains or portions of the protein NS1 combine to form tiny tubules where double-stranded RNA is hidden from the immune system, said Dr. B. V. Venkataram Prasad, professor of biochemistry and molecular biology, molecular virology and microbiology at BCM and his student, Dr. Zachary A. Bornholdt (now of the Scripps Research Institute in La Jolla, Calif.)

"Once we confirm the importance of this structural information, we should be able to design drugs to block this action," said Prasad. "There are other things the protein could do to interfere with different immune mechanisms. We don't know if this is the only mechanism or if there are others that also come into play during influenza virus infection."

The full article can be found at: http://www.bcm.edu/news/item.cfm?newsID=1260

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REAL-TIME PCR COMPARED TO BINAX NOW AND CYTOSPIN-IMMUNOFLUORESCENCE FOR DETECTION OF INFLUENZA IN HOSPITALIZED PATIENTS
Immunotherapy Weekly
November 26, 2008

"Binax NOW, cytospin-enhanced direct immunofluoroescence (DFA), and influenza A and B multiplex TaqMan RT-PCR were performed on 237 clinical samples. Binax NOW detected 70 (53.0%), cytospin-DFA detected 127 (96.2%), and TaqMan RT-PCR detected 132 (100%) influenza-positive samples. The difference in sensitivity was significant between RT-PCR and Binax NOW ($p < 0.0001$), but not between RT-PCR and cytospin-DFA ($p = 0.0736$). Two samples testing positive for influenza B by all three methods, tested falsely positive for influenza A by Binax. Eight true positive samples did not become reactive by Binax until 30 min, and thus were counted as negative. The accuracy of real-time RT-PCR should greatly improve the diagnosis of influenza in hospitals using simple rapid flu tests, but may have a more modest impact in hospitals with expertise in cytospin-DFA."

"Further studies are needed to determine the effect of influenza RT-PCR on patient management and costs in hospitalized patients."

The full article can be found at: (M.L. Landry, et. Al., "Real-time PCR compared to Binax NOW and cytospin-immunofluorescence for detection of influenza in hospitalized patients". Journal of Clinical Virology, 2008;43(2):148-51). Link not available.

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A COMMERCIAL ELISA DETECTS HIGH LEVELS OF HUMAN H5 ANTIBODY BUT CROSS-REACTS WITH INFLUENZA A ANTIBODIES
Health & Medicine Week
November 24, 2008

"Commercial serological assays to determine influenza A H5N1 infection are available, although the accuracy and reproducibility of these are not reported in detail. This study aimed to assess the validity of a commercial ELISA H5 hemagglutinin (HA) antibody kit."

"A commercial ELISA for detection of antibodies towards influenza A H5 HA was evaluated using human sera from vaccinated individuals. The ELISA was used to screen 304 sera with elevated influenza A complement fixation titres collected between the period 1995-2007. The ELISA was found to be accurate for sera with high levels of anti-H5 antibodies, and would be useful in clinical settings where a rapid result is required. Thirteen of the stored sera were positive using the ELISA, but were confirmed as negative for H5N1 exposure using further serological tests."

"Absorption studies suggested that antibodies towards seasonal H3N2 and H1N1 influenza may cross-react with H5 antigen, giving false positive results with the ELISA."

The full article can be found at: (S. Stelzer-Braid, et. Al., "A commercial ELISA detects high levels of human H5 antibody but cross-reacts with influenza A antibodies". Journal of Clinical Virology, 2008;43(2):241-3). Link not available.

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A CONSENSUS-HEMAGGLUTININ-BASED DNA VACCINE THAT PROTECTS MICE AGAINST DIVERGENT H5N1 INFLUENZA VIRUSES
Vaccine Weekly
November 26, 2008

"However, traditional methods of making influenza vaccines have yet to produce a candidate that could induce potently neutralizing antibodies against divergent strains of H5N1 influenza viruses. To address this need, we generated a consensus H5N1 hemagglutinin (HA) sequence based on data available in early 2006. This sequence was then optimized for protein expression before being inserted into a DNA plasmid (pCHA5). Immunizing mice with pCHA5, delivered intramuscularly via electroporation, elicited antibodies that neutralized a panel of virions that have been pseuclotyped with the HA from various H5N1 viruses (clades 1, 2.1, 2.2, 2.3.2, and 2.3.4). Moreover, immunization with pCHA5 in mice conferred complete (clades 1 and 2.2) or significant (clade 2.1) protection from H5N1 virus challenges."

"We conclude that this vaccine, based on a consensus HA, could induce broad protection against divergent H5N1 influenza viruses and thus warrants further study."

The full article can be found at: (M.W. Chen, et. Al., "A consensus-hemagglutinin-based DNA vaccine that protects mice against divergent H5N1 influenza viruses". Proceedings of the National Academy of Sciences of the United States of America, 2008;105(36):13538-13543). Link not available.

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A NOVEL ROLE FOR NON-NEUTRALIZING ANTIBODIES AGAINST NUCLEOPROTEIN IN FACILITATING RESISTANCE TO INFLUENZA VIRUS

Immunotherapy Weekly
November 26, 2008

"Current influenza vaccines elicit Abs to the hemagglutinin and neuraminidase envelope proteins. Due to antigenic drift, these vaccines must be reformulated annually to include the envelope proteins predicted to dominate in the following season."

"By contrast, vaccination with the conserved nucleoprotein (NP) elicits immunity against multiple serotypes (heterosubtypic immunity). NP vaccination is generally thought to convey protection primarily via CD8 effector mechanisms. However, significant titers of anti-NP Abs are also induced, yet the involvement of Abs in protection has largely been disregarded. To investigate how Ab responses might contribute to heterosubtypic immunity, we vaccinated C57BL/6 mice with soluble rNP. This approach induced high titers of NP-specific serum Ab, but only poorly detectable NP-specific T cell responses. Nevertheless, rNP immunization significantly reduced morbidity and viral titers after influenza challenge. Importantly, Ab-deficient mice were not protected by this vaccination strategy. Furthermore, rNP-immune serum could transfer protection to naive hosts in an Ab-dependent manner. Therefore, Ab to conserved, internal viral proteins, such as NP, provides an unexpected, yet important mechanism of protection against influenza."

"These results suggest that vaccines designed to elicit optimal heterosubtypic immunity to influenza should promote both Ab and T cell responses to conserved internal proteins."

The full article can be found at: (D.M. Carragher, et. Al., “A novel role for non-neutralizing antibodies against nucleoprotein in facilitating resistance to influenza virus”. Journal of Immunology, 2008;181(6):4168-4176). Link not available.

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